Impact of postharvest dehydration process of Nebbiolo winegrapes on mechanical and acoustic properties of the seeds and their relationship with flavanol extraction during simulated maceration

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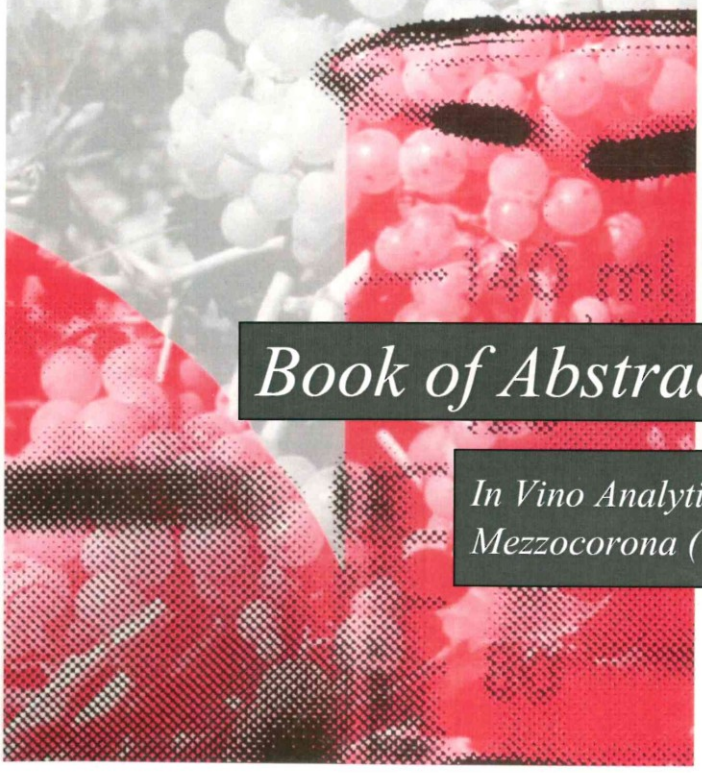

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Impact of postharvest dehydration process of Nebbiolo winegrapes on mechanical and acoustic properties of the seeds and their relationship with flavanol extraction during simulated maceration

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The dehydration of winegrapes is promoted in the production of dry wines (sfursat) with unique and appreciated characteristics. Postharvest dehydration induces significant metabolic changes in the grape berry that affect the chemical composition and physical properties. The magnitude of these changes depends mainly on the grape cultivar and maturity stage, but it can be partially modulated by the management of the dehydration process. The influence of the thermohygrometric conditions on the mechanical attributes and phenolic composition of winegrape seeds has been recently studied.
The histological and histochemical changes that occur in the seeds affect the extractability of phenolic compounds. The oxidation of flavanols favors their association with cell wall components and, therefore, the extractable content of seed flavanols gradually declines during grape ripening. On the other hand, the intensive lignification of the medium integument and the dehydration of the outer integument cause the increase in the hardness and cracking of the seeds. In this sense, a novel methodology has been developed to predict the extractable content of phenolic compounds during ripening from instrumental acoustic parameters of the seeds [1]. However, knowledge on this relationship is lacking during postharvest grape dehydration.
Because the contribution of seed flavanols to total content of the berry increases during dehydration, the aim of this work was to evaluate the effect of postharvest dehydration process of Nebbiolo winegrapes on the instrumental texture properties of the seeds and the extraction of flavanol compounds. Small clusters were withered in an environmentally controlled chamber during different times to obtain berries with a dehydration grade of 15, 30, 45 and 60% weight loss. Various mechanical (F_s, W_s, E_s, DI_s) and acoustic attributes (LD, AE, N_{pk}, AV_{pk}) were determined during the compression test of the seeds. The extraction kinetics into a model solution was followed by the determination of total and individual monomeric, oligomeric and polymeric flavanol compounds. Finally, seed texture parameters were also assessed as predictors of the extractable content of flavanol compounds based on the robustness of the relationships found.

Reference

1. Rolle, L.; Giacosa, S.; Torchio, F.; Perenzoni, D.; Río Segade, S.; Gerbi, V.; Mattivi, F. *Journal of Agricultural and Food Chemistry*, 61 (2013), pp 8752-8764.